

JPRS: 4188

15 November 1960

SCIENTIFIC-TECHNICAL CONFERENCE ON THE USE OF  
COMPUTER ENGINEERING IN THE DESIGN AND  
EXPLOITATION OF POWER SYSTEMS

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-USSR-

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19990723 067

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JPRS: 4188

CSO: 1185-S

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[Following is the translation of an article by L.V. Tsukernik entitled "Nauchno-tehnicheskoye soveshchaniye po primeneniyu vychislitel'noy tekhniki pri proyektirovaniy i ekspluatatsii energosistem" (English version above) in Izvestiya vysshikh uchebnykh zavedeniy -- Elektromekhanika (Bulletin of the Institutions of Higher Education -- Electrical Engineering), No 6, Novocherkassk, June 1960.]

From the 18th through the 21st of May 1960 Kiev was the scene of a major scientific-technical conference on the application of new computation techniques in the design and exploitation of power systems organized by the State Scientific-Technical Committee of the Council of Ministers of the Ukrainian Soviet Socialist Republic, the Central and Kiev Administrative Branches (pravleniya) of the Scientific-Technical Society of the Power Industry, the Electrical Engineering Institute of the Ukrainian SSR Academy of Sciences, the Automation Institute of the State Planning Committee of the Ukrainian SSR, and the Commission on Electrical Power Transmission of the Power Institute of the USSR Academy of Sciences.

Other organizations taking an active part in the preparation of the conference included the Main Soviet Power Industry Administration of the State Planning Committee of the USSR, the All-Union Electrical Power Scientific Research Institute, the Moscow Power Institute, and the Computation Center of the Ukrainian SSR Academy of Sciences.

Among the participants at the conference were repre-

sentatives of 36 scientific research organizations (including 6 computation centers), 12 institutions of higher learning, 47 power departments (energopravleniya) of national economic councils (sovmarkhozy), 23 planning organizations, and also people representing the united controllers' administrations of the unified power system of the USSR, the Southern, Ural, and Siberian power systems, etc. In all, 460 delegates from 47 cities and rayons of the USSR took part in the conference.

In calling the conference to order, the vice-chairman of the GNTK (Gosudarstvennyy nauchno-tehnicheskiy komitet -- State Scientific-Technical Committee) V.N. Valuyev noted the great importance of the effective application of modern computer techniques in one of the major sectors of the USSR national economy, the power industry. The continuity of the technological process, the high level of automation, the role of all-around automation in the economical and dependable functioning of power systems, and the necessity of finding optimum solutions to complex design and planning problems, especially taking into account the rapid growth of the power industry in connection with the general outlook for the development of electrification in the USSR, -- all of these factors open up extremely wide possibilities for the application of both universal and specialized computing machines and installations.

The chairman of the organizational committee for the conference, Doctor of Technical Sciences and Professor V.G. Kholmskiy, in making his introductory address outlined the problems facing the conference, which would for the first time open to wide discussion the experience accumulated in the application of new computer techniques in the design and exploitation power systems, the future tasks in this field, and measures which would insure their successful realization.

The conference agenda consisted of four survey reports and 32 scientific-technical papers. The latter fell into one of five general areas:

I. The application of digital computers in finding the most economical power system operating ranges; regulation of blocks of turbine boilers.

II. Design and application of computer-analyzers for determining economical operating ranges for power systems.

III. General problems of computer application in

determining economical operating ranges for power systems.

IV. The use of computers for the calculation of stability and electromechanical conversion processes in power systems.

V. The design and application of computer devices to the solution of various problems in the field of power production.

Owing to the fact that all of the scientific-technical reports were published in advance in the form of preliminary conference materials which were sent to most of the participating organizations, there was no need for any concurrent meetings on a sectional basis, thus providing the opportunity for wide discussion on topics brought up.

Prior to the discussion of each group of reports at the conference, special speakers designated by the organizational committee delivered capsule summaries of the main points of each paper to be presented. The authors of the reports appeared only to append a few additional remarks to the published materials, and then joined the discussion. The consultations held by the authors of the reports at previously announced locations proved to be another extremely helpful adjunct to the work of the conference as arranged in the program. During the course of these consultations, detailed answers were given to the questions of conference participants.

The conference enjoyed extremely active delegate participation. Altogether 40 persons took part in the report discussions, and 6 additional informational reports were presented. The conference delegates adopted a comprehensive resolution containing numerous recommendations of a fundamental and methodological character. Field trips to the Computation Center of the Ukrainian SSR Academy of Sciences, the Automation Institute of the State Planning Committee, and the Progressive Methods Exhibit of the Ukrainian SSR were arranged for the participants.

The basic recommendations set forth in the conference resolution consist of the following proposals:

I. To establish computation centers in the immediate future at the major scientific power research institutes, institutions of higher learning conducting studies in the field of computer application to power production, at the largest

All-Union planning institutes, as well as at the unified administrative control centers of the major power networks. These computation centers must be equipped with universal mass-produced digital computers (VMTs), improved alternating and direct current circuit analyzers, and mathematical analyzer programming devices (VMN). Calculations requiring the use of unique specialized computers could be performed at the large-scale computation centers of scientific research institutions.

The conference appeals to the GVTK of the USSR to put forth proposals before the Council of Ministers of the USSR requesting that more attention be devoted to computer centers which are coping with the complex problems of power production as one of the major sectors of the national economy.

II. To develop the cooperative ties established within recent years between planning organizations and power system [technical departments] on the one hand, and scientific research organizations which have access to electrical power system analyzers on the other.

The conference notes with satisfaction the very favorable results achieved in the USSR in the matter of using VMTs, VMN devices, and analyzers in various integrated combinations.

III. To accelerate the development, testing, and application of experimental automatic control installations for regulating large blocks of turbine boilers at thermo-electric power stations; this to be followed by the mass production of tested apparatus. To apply increased efforts to finding new areas for using computer methods in controlling and regulating power systems.

IV. Considering it necessary to emphasize the importance of having on hand reliable basic data in order to assure the effective exploitation of modern computer techniques, the conference recommends that an extensive program of experiments be instituted by power systems and stations to obtain various operational specifications for power installations and system components.

V. To accelerate the channelling of requests submitted to the electrical industry to expedite production of test equipment giving digital readings, and metering apparatus to measure various physical quantities in the operating ranges of thermoelectric power equipment which would automatically feed information into the computing installations

on a continuous or discrete basis.

The electrical industry must also master the mass production of improved alternating-current analyzers and other equipment.

VI. To systematically conduct, generalize, and publish studies on information gained in using computer techniques for the design and exploitation of power systems.

VII. To regard as expedient to organize at the major institutions of higher learning a special major program of study bearing the title "Electrical Systems"; also to include in the curricula of all electrical engineering majors courses in computer methods and to foster the inclusion of computer equipment in university and technical school laboratories.

VIII. To carry out a coordinated effort for compiling a library of standard computer programs based on the calculation of typical situations and problems; to conduct special conferences for the discussion and approval of methods, programs, and results.

The preparation of standard computer programs to be used in mass-produced computers requires the organization of preliminary studies such as are carried on within the framework of the State Standards program.

IX. To request the GNTK of the USSR and the State Automation and Machinery Construction Committee of the USSR Council of Ministers to provide the necessary coordination of effort in the creation and development of resources in the field of computer methods for power production.